

### REMARKS

In the August 19, 2008 Office Action, claims 1-6, 9, 11-15 and 19 stand rejected in view of prior art, while claims 7, 8, 10, 16-18 and 20 were indicated as containing allowable subject matter. Moreover, claims 1-11 and 20 were rejected for failing to indicate and claim particularly and distinctly the subject matter that Applicants regard as the invention. Furthermore, claims 1-20 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. No other objections or rejections were made in the Office Action.

#### *Status of Claims and Amendments*

In response to the August 19, 2008 Office Action, Applicants have amended claims 1, 4, 11 and 13 as indicated above. Applicants wish to thank Examiner Patel for the indication of allowable subject matter and the thorough examination of this application. Thus, claims 1-20 are pending, with claims 1 and 11 being the only independent claims. Reexamination and reconsideration of the pending claims are respectfully requested in view of above amendments and the following comments.

#### *Claim Rejections - 35 U.S.C. §112*

In numbered paragraph 3 of the Office Action, claims 1-11 and 20 were rejected under 35 U.S.C. §112, second paragraph.

First, claims 1-11 were rejected because the term “chemical reaction characteristic time” is indefinite. In response, Applicants have amended claims 1, 4 and 13 to delete the recitation of “chemical reaction characteristic time” in these claims. Thus, Applicants believe this rejection is now moot.

Second, claims 10 and 20 were rejected because it is unclear how only the one equation is used to represent all three variables (transport, generation and diffusion).

Applicants respectfully assert that the equation recited in claims 10 and 20 is composed of three terms including a transport term, a generation term, and a diffusion term as follows:

$$\underbrace{\frac{\partial \Sigma}{\partial t} + \frac{\partial u_i \Sigma}{\partial x_i}}_{\text{Transport Term}} = \underbrace{\frac{\partial}{\partial x_i} \left( \frac{v_i}{\sigma_c} \frac{\partial \Sigma}{\partial x_i} \right)}_{\text{Diffusion Term}} + \underbrace{\alpha_l (Re_l)^{\alpha_2} \Gamma \frac{\varepsilon}{\kappa} \Sigma + \beta_l \exp(-\beta_2 K a) \frac{T_b}{T_u} U_L \Sigma^2 - D}_{\text{Generation Term}},$$

Accordingly, the above equation expresses transport, generation, and diffusion of the flame surface area density. Therefore, Applicants believe claims 10 and 20 are clear.

Withdrawal of the rejections is respectfully requested.

### ***Rejections - 35 U.S.C. § 101***

In numbered paragraph 5 of the Office Action, claims 1-20 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. More specifically, the Office Action indicates the claim language is such that a reasonable interpretation of the claims would not result in any useful, concrete or tangible product.

In response, Applicants have amended independent claims 1 and 11 so that the claimed method of modeling flame propagation is tied to a particular machine (i.e., a combustion chamber). Applicants note that the recent decision by the Federal Circuit held that the “useful, concrete and tangible result” inquiry for determining the patent-eligibility is inadequate and reaffirmed that the machine-or-transformation test outlined by the Supreme Court is the proper test to apply. *In re Bliski* 2007-1130 Under the machine-or-transformation test, a claimed process is patent eligible if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.

In the present case, the methods recited in amended claims are clearly tied to a particular machine (i.e., the combustion chamber). Therefore, Applicants believe the

methods recited in independent claims 1 and 11 are patent-eligible under 35 U.S.C. §101.

Withdrawal of the rejection is respectfully requested.

***Rejections - 35 U.S.C. § 102***

In numbered paragraphs 6 of the Office Action, claims 1-6, 9, 11-15 and 19 stand rejected under 35 U.S.C. §102(b) as being anticipated by a non-patent literature “Application of Direct Numerical Simulation to Premixed Turbulent Combustion” by Poinso et al. (hereinafter “Poinso et al. publication”). Applicants respectfully traverse the rejection for the reasons set forth below.

Independent claim 1 clearly recites expressing flame progress within the combustion chamber as generation of the flame surface area density in terms of at least one of a ***turbulent combustion*** and a laminar combustion and determining flame growth within the combustion chamber resulting from ***turbulent combustion*** as a function of a turbulent Reynolds number. The Office Action appears to assert section 2.2.1 of the Poinso et al. publication discloses these limitations. However, the cited section of the Poinso et al. publication merely discusses a Reynolds number is used to express an energy during turbulent attenuation. The cited section of the Poinso et al. publication is ***absolutely silent*** about determining flame growth resulting from ***turbulent combustion*** as a function of a turbulent Reynolds number. It is well settled under U.S. patent law that for a reference to anticipate a claim, the reference ***must*** disclose ***each and every element*** of the claim within the reference. Therefore, Applicants respectfully submit that claim 1 is ***not*** anticipated by the Poinso et al. publication or any other prior art of record.

Independent claim 11 clearly recites determining flame growth within the combustion chamber resulting from ***laminar combustion*** as being proportional to both a ***laminar flame speed*** and to ***a ratio of a temperature of a burned portion to a temperature of an unburned***

*portion* and as *a function of the Karlowitz number*. Applicants respectfully assert the Poinso et al. patent is *absolutely silent* about determining the flame growth resulting from laminar combustion as being proportional to both a *laminar flame speed* and *a ratio of a temperature of a burned portion to a temperature of an unburned portion* and as *a function of the Karlowitz number*. As mentioned above, for a reference to anticipate a claim, the reference *must* disclose *each and every element* of the claim within the reference. Therefore, Applicants respectfully submit that claim 1 is *not* anticipated by the Poinso et al. publication or any other prior art of record.

Moreover, Applicants believe that dependent claims 2-6, 9, 12-15 and 19 are also allowable over the prior art of record in that they depend from independent claim 1 or 11, and therefore are allowable for the reasons stated above. Also, dependent claims 2-6, 9, 12-15 and 19 are further allowable because they include additional limitations. Thus, Applicants believe that since the prior art of record does not anticipate independent claims 1 and 11, neither does the prior art anticipate the dependent claims.

Applicants respectfully request withdrawal of the rejections.

#### *Allowable Subject Matter*

In numbered paragraphs 7 and 8 of the Office Action, claims 7, 8, 10, 16-18 and 20 were indicated as containing allowable subject matter. Applicants wish to thank Examiner Patel for this indication of allowable subject matter and the thorough examination of this application. As discussed above, Applicants believe independent claims 1 and 11 are allowable over the prior art of record. Therefore, claims 7, 8, 10, 16-18 and 20 remain dependent from one of independent claims 1 and 11 in the current Amendment.

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Appl. No. 10/771,285  
Amendment dated November 17, 2008  
Reply to Office Action of August 19, 2008

In view of the foregoing amendment and comments, Applicants respectfully assert that claims 1-20 are now in condition for allowance. Reexamination and reconsideration of the pending claims are respectfully requested.

Respectfully submitted,

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